VOL. 04 NO. 04 May/June 1998

USACHPPM

MSMR

Medical Surveillance Monthly Report

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Army Medical Surveillance Activity (AMSA)

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Data in the MSMR is provisional, based on reports and other sources of data available to the Medical Surveillance Activity. Notifiable conditions are reported by date of onset (or date of notification when date of onset is absent). Only cases submitted as confirmed are included.

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Surveillance Trends

Completeness and Timeliness of Reporting of Notifiable Diseases/ Conditions, US Army, July 1997 - December 1997

The Army Medical Surveillance Activity (AMSA) periodically assesses the completeness and timeliness of reporting of notifiable diseases/conditions. The methodology of the assessment has been described in previous MSMRs.[1,2] In brief, for defined periods, records of hospitalizations of active duty soldiers were searched to identify those with principal discharge diagnostic codes indicative of reportable diseases/conditions. These records were then compared to reports received through the Army's automated notifiable diseases reporting system (MSS). Completeness of reporting was estimated as the percent of hospitalized cases that were reported through the MSS; among hospitalized cases reported through the MSS, timeliness of reporting was estimated based on the distribution of times from hospital admissions to corresponding MSS reports.

Completeness: During the period July through December 1997, there were 273 hospitalizations of active duty soldiers for diseases/conditions presumed to be reportable. Of these, 120 (44.0%) were reported through the MSS. Completeness of reporting during the most recent assessment period markedly exceeded that during earlier periods (figure 1).

During the period, nearly two-thirds (75 of 118, 63.6%) of reportable infectious disease cases but less than one third (45 of 155, 29.0%) of other reportable conditions (i.e., heat stroke, heat exertion, rhabdomyolysis, carbon monoxide intoxication, chemical agent exposure, Guillain-Barre syndrome) were reported through the MSS. Completeness of reporting of infectious cases significantly increased in the most recent compared to previous periods. In contrast, proportions of non-infectious cases reported through MSS have remained relatively stable (figure 1).

Two reporting sites, Forts Eustis and Drum, had 100% reporting completeness (albeit each had only 1 or 2 reportable hospitalized cases). Reporting sites at Fort Campbell, Tripler Army Medical Center (Hawaii), and Korea reported more than 70% of larger numbers of reportable hospitalized cases.

Timeliness: Of hospitalized cases reported through the MSS, more than 58% were reported within one week, and more than 80% within three weeks, of admission (table 1). The estimated timeliness during the latter half of 1997 was comparable to that during earlier periods (figure 2).

Editorial Comment: This report summarizes findings of the third semiannual assessment of completeness and timeliness of notifiable disease reporting in the Army. The results suggest that during the most

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Prepared by the Medical Surveillance Activity, Directorate of Epidemiology and Disease Surveillance, United States Army Center for Health Promotion and Preventive Medicine.
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Figure 1. Completeness of reporting, hospitalized reportable cases, overall and by category, 1996 - 1997

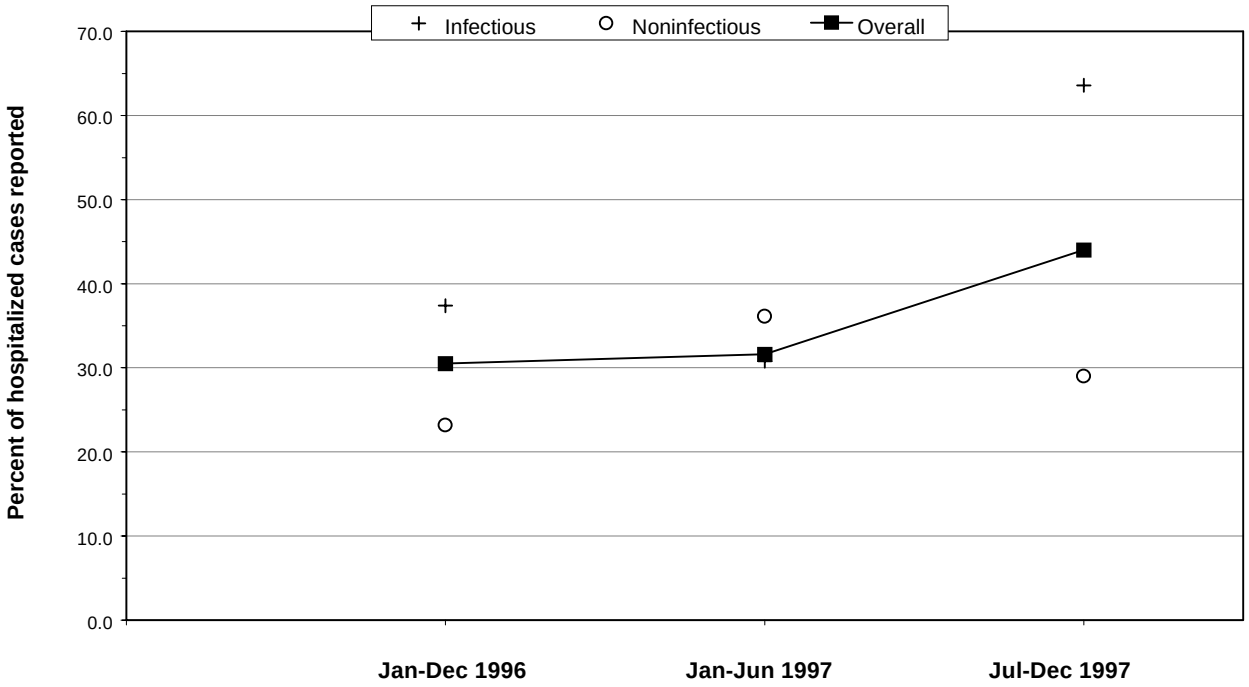


Table 1. Timeliness of reporting, reportable hospitalizations among soldiers, Jul - Dec 1997

Interval	Percent in Interval	Cumulative Percent
< 1 week	58.3%	58.3%
1-2 weeks	14.2%	72.5%
2-3 weeks	9.2%	81.7%
3-4 weeks	5.8%	87.5%
1-2 months	5.8%	93.3%
> 2 months	6.7%	100.0%

Figure 2. Timeliness of reporting, 1996-1997

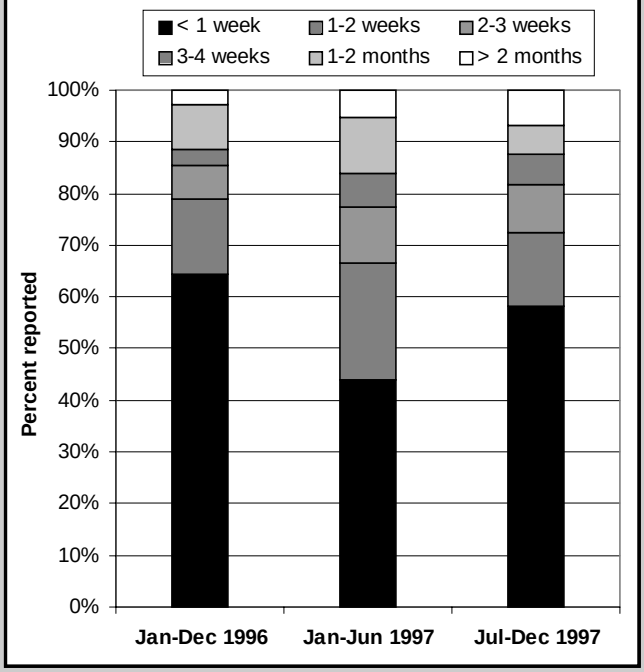


TABLE I. Selected sentinel reportable diseases, US Army medical treatment facilities*
May, 1998

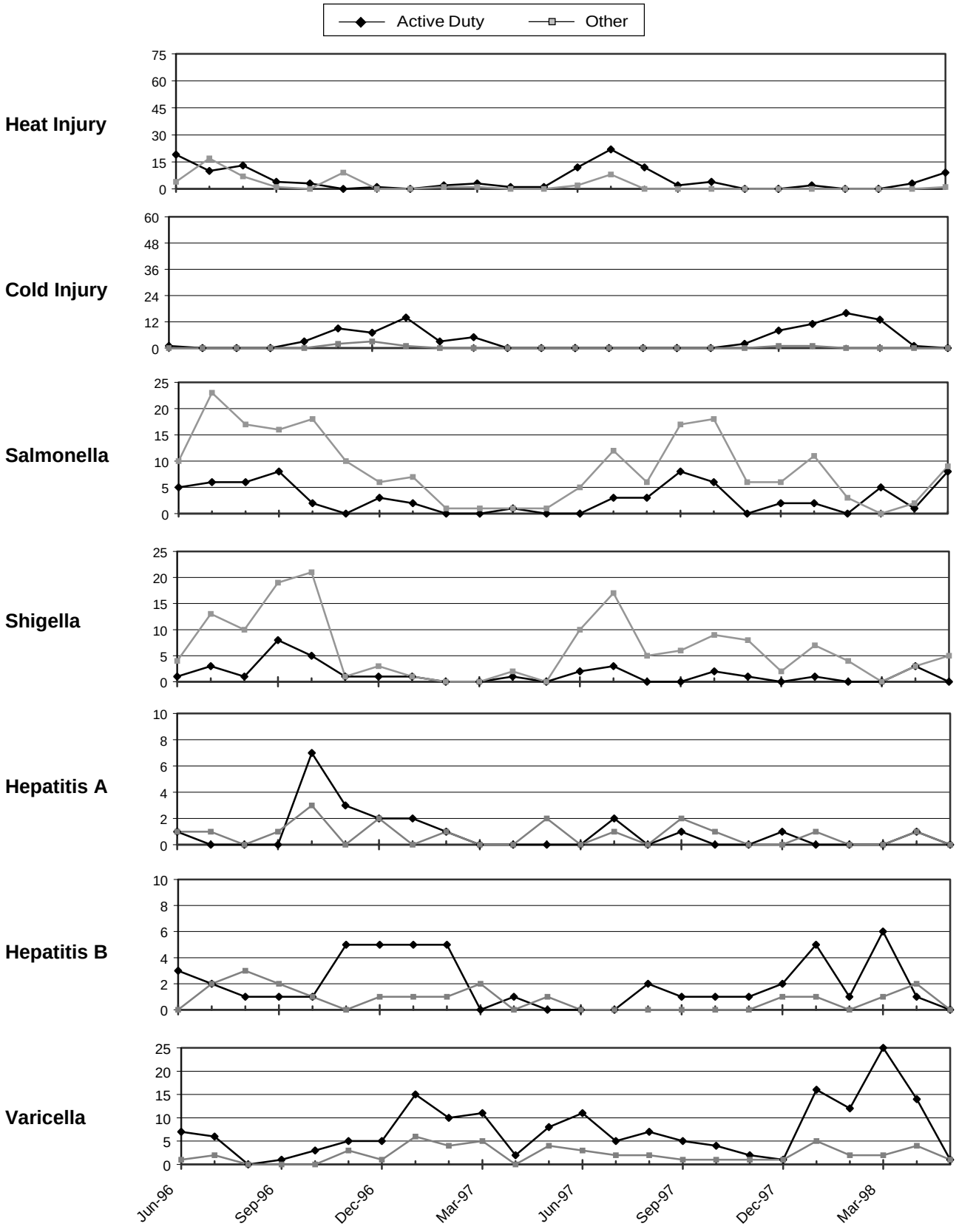
Reporting MTF/Post**	Total number of reports submitted May 1998	Environmental Injuries		Viral Hepatitis		Salmonellosis		Shigella		Varicella	
		Active Duty				Active Duty	Other	Active Duty	Other	Active Duty	Other Adult
		Heat	Cold	A	B						
		Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998
NORTH ATLANTIC RMC											
Walter Reed AMC	25	0	0	1	0	0	2	0	0	3	0
Aberdeen Prov. Ground, MD	3	0	0	0	1	0	0	0	0	0	0
FT Belvoir, VA	25	0	0	0	0	0	8	0	1	1	0
FT Bragg, NC	3	3	1	0	0	12	3	2	15	0	0
FT Drum, NY	7	0	14	0	0	0	0	0	0	2	2
FT Eustis, VA	22	1	0	0	0	0	1	1	2	5	1
FT Knox, KY	32	0	0	0	0	0	0	0	0	18	0
FT Lee, VA	0	0	0	0	0	0	0	0	0	0	0
FT Meade, MD	27	0	0	0	0	0	0	0	0	3	0
West Point, NY	1	0	0	1	1	0	0	0	0	0	1
GREAT PLAINS RMC											
Brooke AMC	4	0	0	2	2	0	1	0	1	2	0
Beaumont AMC	45	0	0	0	0	0	0	0	0	7	1
FT Carson, CO	77	4	1	0	0	1	1	0	0	3	0
FT Hood, TX	185	1	0	0	8	0	0	1	2	0	1
FT Huachuca, AZ	0	0	0	0	0	0	0	0	0	0	0
FT Leavenworth, KS	3	0	0	0	0	0	1	0	0	0	0
FT Leonard Wood, MO	25	1	1	0	0	0	0	0	0	13	7
FT Polk, LA	8	0	0	0	0	0	0	0	0	0	0
FT Riley, KS	19	0	1	0	0	1	0	0	0	3	0
FT Sill, OK	39	0	0	0	7	0	0	0	0	0	0
SOUTHEAST RMC											
Eisenhower AMC	26	0	0	0	0	0	0	0	0	0	0
FT Benning, GA	26	6	1	0	1	0	1	0	2	2	0
FT Campbell, KY	42	1	1	0	0	0	2	0	1	1	3
FT Jackson, SC	19	1	1	1	0	0	0	0	1	5	0
FT McClellan, AL	0	1	0	0	0	0	0	0	0	0	0
FT Rucker, AL	0	0	0	0	0	0	0	0	0	0	0
FT Stewart, GA	34	1	1	0	0	0	0	0	0	3	0
WESTERN RMC											
Madigan AMC	56	0	0	0	0	0	3	0	0	3	0
FT Irwin, CA	5	0	0	0	0	0	0	0	0	0	0
FT Wainwright, AK	6	0	9	0	0	0	0	0	0	0	0
OTHER LOCATIONS											
Tripler	43	0	0	0	0	0	1	0	0	0	0
Europe	125	0	22	2	11	14	8	0	0	6	2
Korea	3	0	0	1	2	0	0	0	0	1	0
Total	**935**	**20**	**53**	**8**	**33**	**28**	**32**	**4**	**25**	**81**	**18**

* Based on date of onset.

** Reports are included from main and satellite clinics. Not all sites reporting.

Date of Report: 7-Jun-98

FIGURE I. Selected sentinel reportable diseases, US Army medical treatment facilities*
Cases per month, Jun 96 - May 98



* Reports are included from main and satellite clinics. Not all sites reporting.

Date of report: 7-Jun-98

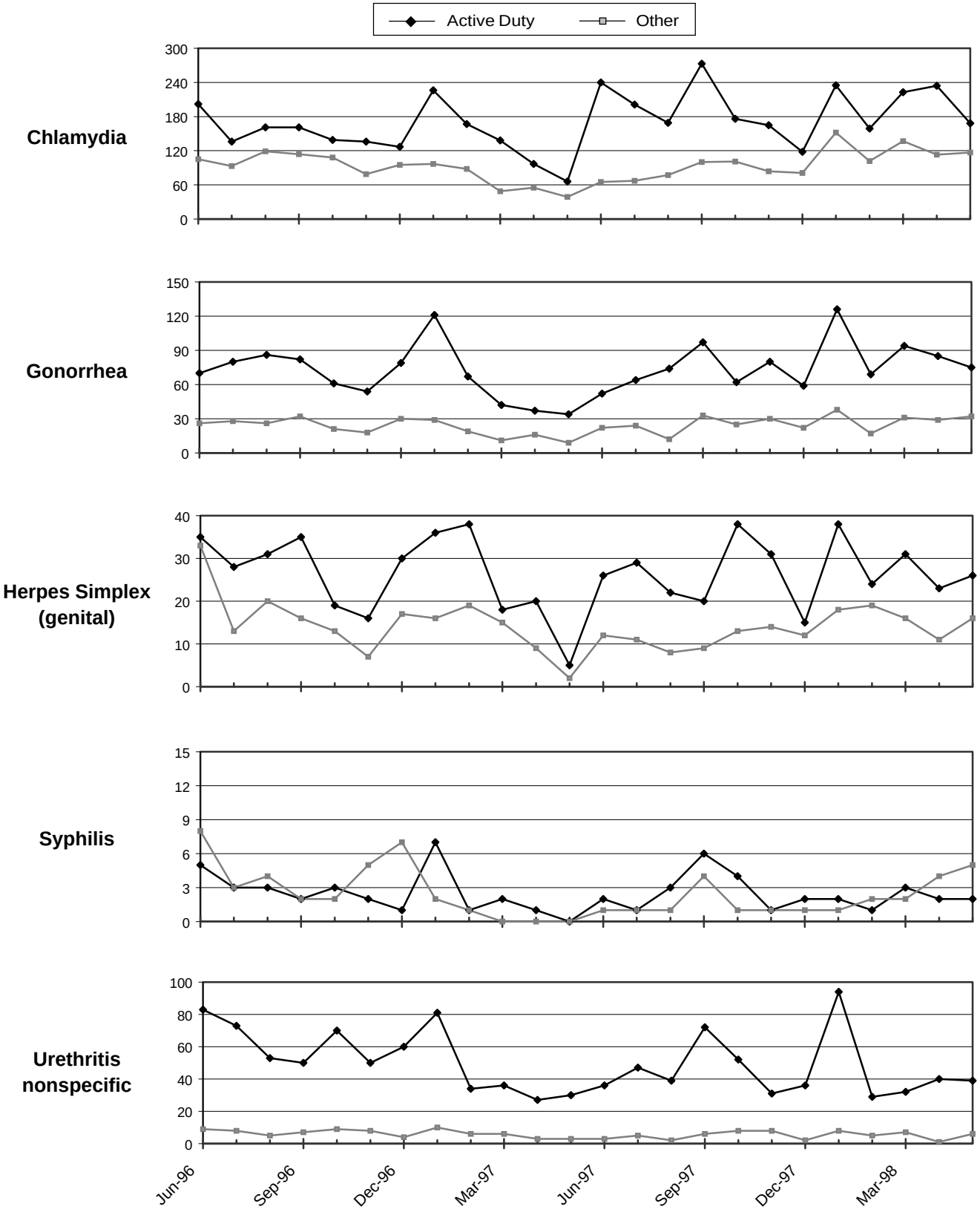
TABLE II. Reportable sexually transmitted diseases, US Army medical treatment facilities*
May, 1998

Reporting MTF/Post**	Chlamydia		Urethritis non-spec.		Gonorrhea		Herpes Simplex		Syphilis Prim/Sec		Syphilis Latent		Other STDs**	
	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998
NORTH ATLANTIC RMC														
Walter Reed AMC	3	28	0	3	3	9	0	10	0	0	2	2	2	2
Aberdeen Prov. Ground, MD	1	11	0	1	0	1	0	1	0	0	0	0	0	0
FT Belvoir, VA	10	77	0	0	6	21	3	23	0	0	0	0	2	11
FT Bragg, NC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FT Drum, NY	4	41	1	2	2	10	1	10	0	0	0	0	0	0
FT Eustis, VA	9	47	0	0	8	20	0	0	0	0	0	1	0	0
FT Knox, KY	12	80	0	0	8	30	4	27	0	0	0	0	0	0
FT Lee, VA	0	19	0	0	0	10	0	0	0	0	0	0	0	0
FT Meade, MD	0	27	0	29	0	4	0	15	0	1	0	0	0	0
West Point, NY	0	6	0	0	0	3	0	4	0	0	0	0	0	0
GREAT PLAINS RMC														
Brooke AMC	16	82	0	0	6	21	0	1	0	1	0	0	0	0
Beaumont AMC	11	121	0	0	7	45	2	14	0	0	0	1	0	0
FT Carson, CO	41	177	13	70	7	39	3	16	0	1	0	0	0	0
FT Hood, TX	25	422	3	91	10	195	4	49	0	1	0	0	0	3
FT Huachuca, AZ	0	7	0	0	0	2	0	0	0	0	0	0	0	0
FT Leavenworth, KS	3	13	0	0	0	1	0	0	0	0	0	0	0	0
FT Leonard Wood, MO	10	46	3	14	2	14	0	0	0	0	0	0	1	1
FT Polk, LA	1	15	0	0	0	5	0	1	0	0	0	0	0	0
FT Riley, KS	20	107	0	0	3	30	0	1	0	0	0	0	0	0
FT Sill, OK	10	68	1	15	12	50	1	6	0	0	0	0	0	1
SOUTHEAST RMC														
Eisenhower AMC	4	61	0	0	2	7	3	18	0	0	0	0	0	0
FT Benning, GA	14	108	3	3	7	41	4	15	0	0	0	0	0	0
FT Campbell, KY	30	194	0	0	7	76	1	12	0	0	0	1	0	1
FT Jackson, SC	5	89	0	0	0	40	0	3	0	0	0	0	0	1
FT McClellan, AL	0	0	0	0	0	2	0	0	0	0	0	0	0	0
FT Rucker, AL	0	10	0	0	0	3	0	2	0	0	0	0	0	0
FT Stewart, GA	11	67	10	81	6	43	6	33	0	0	0	0	0	0
WESTERN RMC														
Madigan AMC	24	147	11	63	1	19	1	13	0	0	0	0	0	0
FT Irwin, CA	2	17	0	0	0	2	0	0	0	0	0	0	0	0
FT Wainwright, AK	0	25	0	0	0	2	0	0	0	0	0	0	0	0
OTHER LOCATIONS														
Tripler	17	96	0	0	7	31	9	43	0	0	0	0	0	0
Europe	2	286	0	0	2	49	0	22	0	3	0	1	0	4
Korea	0	21	0	0	1	11	0	2	0	0	0	0	0	0
Total	**285**	**2515**	**45**	**372**	**107**	**836**	**42**	**341**	**0**	**7**	**2**	**6**	**5**	**24**

* Reports are included from main and satellite clinics. Not all sites reporting. Date of Report: 7-Jun-98

** Other STDs: (a) Chancroid (b) Granuloma Inguinale (c) Lymphogranuloma Venereum (d) Syphilis unspec. (e) Syph, tertiary (f) Syph, congenital

FIGURE II. Reportable sexually transmitted diseases, US Army medical treatment facilities*
Cases per month, Jun 96 - May 98



* Reports are included from main and satellite clinics. Not all sites reporting.

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recent assessment period there was an increase in reporting of notifiable diseases/conditions Armywide without a degradation (or improvement) of timeliness of reporting.

The methodology used for assessing reporting performance has inherent weaknesses that should be considered when interpreting the results. For example, "gold standard" cases for routine Armywide assessments are identified based on International Classification of Diseases, 9th revision (ICD-9) coded hospital discharge diagnoses. However, over the course of thousands of hospitalizations, some nonreportable conditions are inevitably miscoded with reportable case codes (resulting in "false" reportable cases). Unfortunately, for assessment purposes, such cases are inappropriately counted as missed reportable cases. Also, there is not a one-to-one correspondence between ICD-9 codes and reportable diseases/conditions; thus, some hospitalizations are properly annotated with reportable case codes and also properly not reported through the MSS. Such cases may be improperly counted, however, as "missed" reportable cases in routine periodic completeness and timeliness assessments. Both circumstances result in underestimation of actual reporting completeness. Since the same methodology is used consistently in periodic assessments of reporting completeness, estimates of trends should be relatively unaffected by these potential biases.

It is noteworthy that reportable infectious disease cases were reported much more completely than noninfectious diseases/conditions. Rhabdomyolysis, a condition that has been relatively poorly reported in the Army, is not included in the new triservice consensus list of reportable diseases/conditions; if for no other reason, overall completeness of reporting in the Army should improve after the new consensus list is implemented. Still, there are several potential explana-

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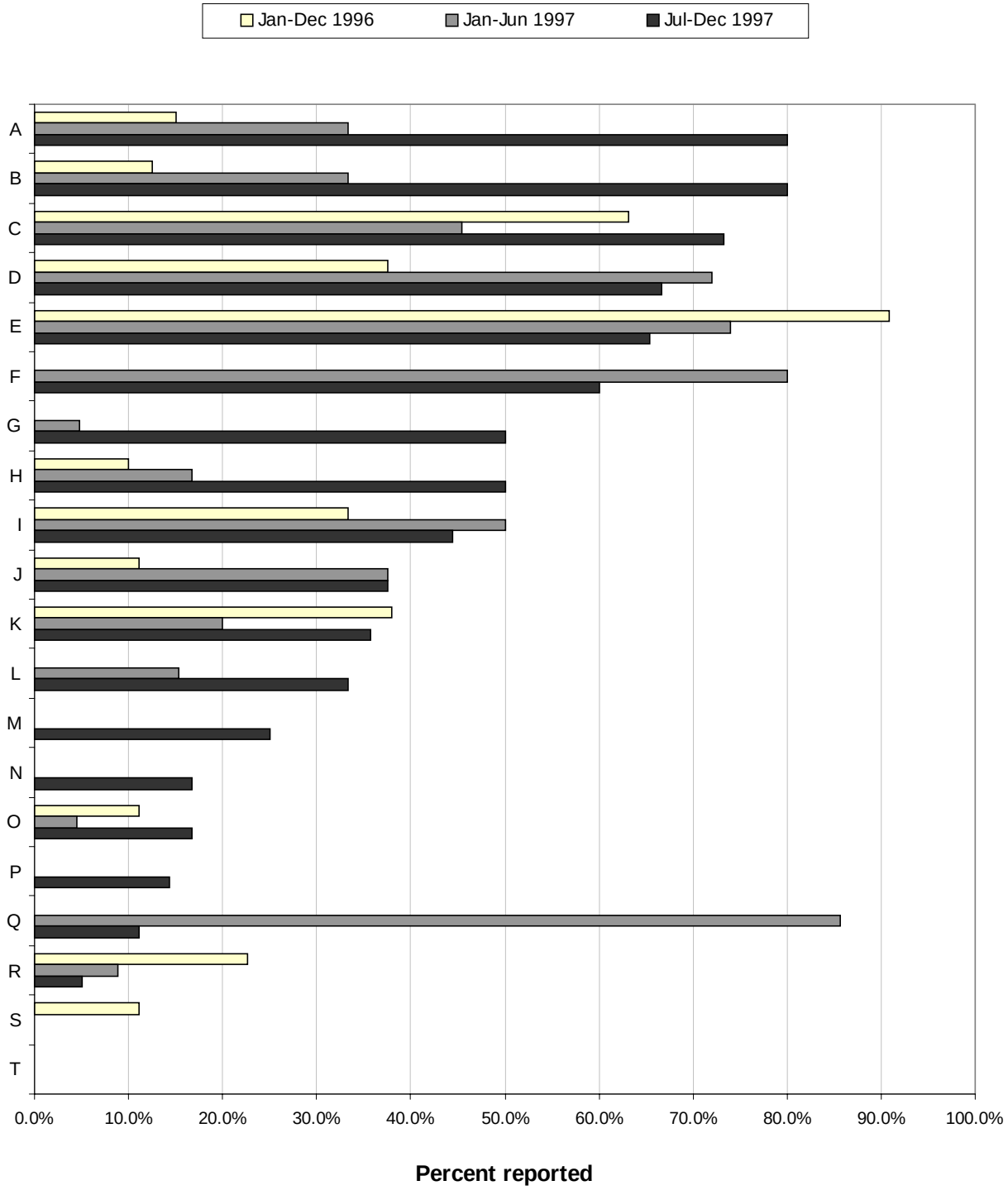
Table 2. Reporting completeness by MTF, July - December 1997

	Hospitalizations			All reports		
MTF	Number reported	Total	Number reported/ total number	Reports received Jul - Dec	Non-STD reports received	STD reports received
A	12	15	80.0	359	63	296
B	4	5	80.0	223	31	192
C	22	30	73.3	68	37	31
D	16	24	66.7	180	59	121
E	17	26	65.4	130	39	91
F	6	10	60.0	248	27	221
G	8	16	50.0	586	106	480
H	4	8	50.0	183	12	171
I	8	18	44.4	896	40	856
J	3	8	37.5	355	24	331
K	5	14	35.7	75	33	42
L	5	15	33.3	40	7	33
M	2	8	25.0	152	18	134
N	1	6	16.7	131	10	121
O	1	6	16.7	197	24	173
P	1	7	14.3	16	1	15
Q	1	9	11.1	289	11	278
R	1	20	5.0	85	85	0
S	0	10	0.0	68	2	66
T	0	7	0.0	288	34	254
U	0	6	0.0	142	7	135

Figure 3. Completeness of reporting, reportable hospitalizations, by reporting site, 1996 - 1997



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tions for the relative underreporting of noninfectious conditions. First, most Army preventive medicine services are required to report specified diseases/conditions to civilian public health authorities (e.g., county/state health departments). Given that most civilian notifiable diseases are infectious in nature, one would expect more complete and accurate reporting of infectious diseases to the extent that the civilian and military requirements overlap. Also, preventive medicine staffs may ascertain reportable infectious disease cases through clinical and/or laboratory channels. In contrast, noninfectious cases are generally ascertainable only through clinical channels, and many clinicians remain relatively unaware of noninfectious disease reporting requirements.

In the past year, preventive medicine representatives of the Army, Navy, Air Force, and Marines developed a triservice consensus list of reportable diseases/conditions. In the course of their work, the group also developed standard case definitions, reporting procedures, and summarization methods for notifiable disease surveillance. Implementation (scheduled for this summer) of the consensus triservice list, case definitions, and procedures will for the first time standardize notifiable disease reporting throughout the DoD.

References

1. USACHPPM. Completeness and timeliness of required disease reporting: Reportable hospitalizations among active duty soldiers, CY 1996. Medical Surveillance Monthly Report (MSMR), 1997, 3:3(April), 8-11.
2. USACHPPM. Completeness and timeliness of required disease reporting: Reportable hospitalizations among active duty soldiers, January-June 1997. Medical Surveillance Monthly Report (MSMR), 1997, 3:8(November), 12-3.

Table 3. Completeness of reporting, reportable hospitalizations among soldiers, July - December 1997

Notifiable disease/condition	Number reported	Reportable hospitalizations	Percent reported
Leprosy	2	2	100.0
Malaria	24	26	92.3
Leishmaniasis	4	5	80.0
Salmonellosis	4	5	80.0
Heat stroke	22	33	66.7
Gonorrhea	2	3	66.7
Hepatitis A, Acute	2	3	66.7
Hepatitis B, Acute	2	3	66.7
Meningitis, bacterial	1	2	50.0
Varicella, adult only	18	38	47.4
Meningitis, aseptic/viral	14	42	33.3
Lyme disease	1	3	33.3
Rhabdomyolysis	13	42	31.0
Heat exhaustion	10	33	30.3
Tuberculosis, pulmonary	1	6	16.7
Carbon monoxide intoxication	0	3	0.0
Chemical agent exposure	0	2	0.0
Coccidioidomycosis	0	3	0.0
Encephalitis	0	1	0.0
Guillain-Barre Syndrome	0	5	0.0
Hepatitis C, Acute	0	2	0.0
Influenza	0	1	0.0
Pneumococcal pneumonia	0	7	0.0
Rocky mountain spotted fever	0	1	0.0
Shigellosis	0	1	0.0
Syphilis	0	1	0.0

Case Report

Elevated Blood Lead in a Child with Clinical Signs of Toxicity, Fort Campbell, Kentucky

In March 1998, the three year old daughter of an active duty soldier presented to the primary care clinic at Blanchfield Army Community Hospital, Fort Campbell, Kentucky, with a one day history of nausea, headache, and temperature to 101°F. Physical examination of the child was normal, and a diagnosis of viral upper respiratory infection was made.

Prior to the clinic visit, the child's mother saw a television announcement that led her to realize that her daughter had symptoms of lead poisoning (e.g., chronic constipation, recurrent nausea, developmental delays). In response to the mother's concerns, the careprovider checked the child's blood lead level. An assay revealed a concentration of 35 micrograms per deciliter (mcg/dl). A followup level approximately one month later was 15 mcg/dl.

In April 1998, the child's primary care provider initiated a comprehensive case management plan that included a complete laboratory work-up, evaluation of the child's speech development, and an environmental assessment. Laboratory results revealed that the child was anemic, and she was started on oral iron supplementation.

A community health nurse and an environmental science officer from the local Preventive Medicine Service visited the family at their home. The parents described longstanding concerns regarding the pace and character of the child's development. For example, the child seemed to lag behind her contemporaries in acquiring motor skills, developing language, and following directions. A complete developmental assessment revealed significant speech and language delays and mild to moderate global delays. The child was referred to an on-post developmental preschool program which she is expected to begin in the fall.

For approximately 18 months, the family had lived in 1960s vintage on-post government quarters. Inspection of the quarters revealed generally clean and well-maintained indoor living areas. However, paint on the kitchen door was flaking, and there were areas of the walls at nearly every corner of the residence where the child had chewed on the wallboard (the parents described the child's history of pica which was expressed through chewing rugs, chalk, magazines, books, and walls; picking, peeling, and eating paint; and eating dirt and rocks). Outside the residence, there were two storage areas with peeling and chipping paint. Environmental assessment of the residence included swipes for paint dust, sampling of soil from the backyard play area, and x-ray fluorescence (XRF) readings of walls, doors, and ceramic items. The two outside storage doors were found to have high levels of lead. The family was counseled regarding lead exposure prevention and nutritional aspects of lead poisoning, and the child was referred for a complete nutritional assessment.

During followup, the child's blood lead levels steadily declined (to 10 mcg/dl at the most recent evaluation in late May) probably due, at least in part, to increased parental lead hazard awareness and subsequent closer parental supervision. In addition, in February 1998, the child's mother began working outside the home, and as a result, the child spent most of her time during the day in a lead-free environment.

Management and close followup of the case are ongoing.

Editorial comment: Lead is a naturally occurring element that is continuously released into the environment during mining, smelting, processing, use, recycling, and disposal activities. Lead-based paint (in homes built before 1978) remains the most important source of lead exposure of children. While actions taken by the Environmental Protection Agency (EPA), the Food and Drug Administration

(FDA), and the Occupational Safety and Health Administration (OSHA) have reduced potential exposures from the environment, childhood lead poisoning remains a major preventable health problem in the United States.

In recent years, average blood lead levels have declined dramatically in the United States[1]; still, it is estimated that from 1991 to 1994, there were 890,000 U.S. children aged 1 to 5 years with blood lead levels greater than or equal to 10 mcg/dl (levels that indicate, as a minimum, family education and follow-up testing).[2] Blood lead levels as low as 10-15 mcg/dl are associated with diminished intelligence, slowed neurological development, decreased hearing acuity, and growth deficits. Higher levels can result in severe damage to the renal, hematopoietic, and central nervous systems and even death. Thus, recent Centers for Disease Control and Prevention guidelines for preventing lead poisoning in children remain relevant to many civilian and military communities.[3]

Lead education and awareness programs are needed for both the general public and the health care community. Patients and their family members often ask questions of careproviders during clinic visits. Such situations provide good opportunities for family preventive health counseling. For example, in response to questions regarding child health and safety, providers can suggest ways to reduce environmental lead exposure risks, including 1) ensure that floors, window sills, toys, and other surfaces are clean; 2) provide a healthful, nutritionally balanced diet; 3) prevent children from chewing painted surfaces; and 4) encourage good personal hygiene practices (e.g., washing hands). The *Guide to Clinical Preventive Services (2d edition)* of the US Preventive Services Task Force[4] provides careproviders with questions that may be useful for assessing lead exposure risks, guidelines for interpreting blood lead levels, and appropriate follow-up practices.

Report and editorial comment submitted by Kevin Michaels, MAJ, MC, Chief, Preventive Medicine Service, and Beverly Morgan, CPT, AN, Chief, Community Health Nursing, Fort Campbell, Kentucky.

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1. Pirkle, JL, Brody, DJ, Gunter, EW, Kramer, RA, Paschal, DC, Flegal, KM, Matte, TD. The decline in blood lead levels in the United States. The National Health and Nutrition Examination Surveys. JAMA, 1994, 27:272(4), 284-291.
2. Centers for Disease Control and Prevention. Update: blood lead levels-United States, 1991-1994. MMWR, 1997, 46, 141-6.
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Correction, Vol. 04, No. 03 (April 1998)

In Figure III on page 15, the ARD Surveillance Update showed incorrect rates for Forts Jackson, Leonard Wood, and McClellan. The actual ARD rates are shown in the current issue.

ARD Surveillance Update

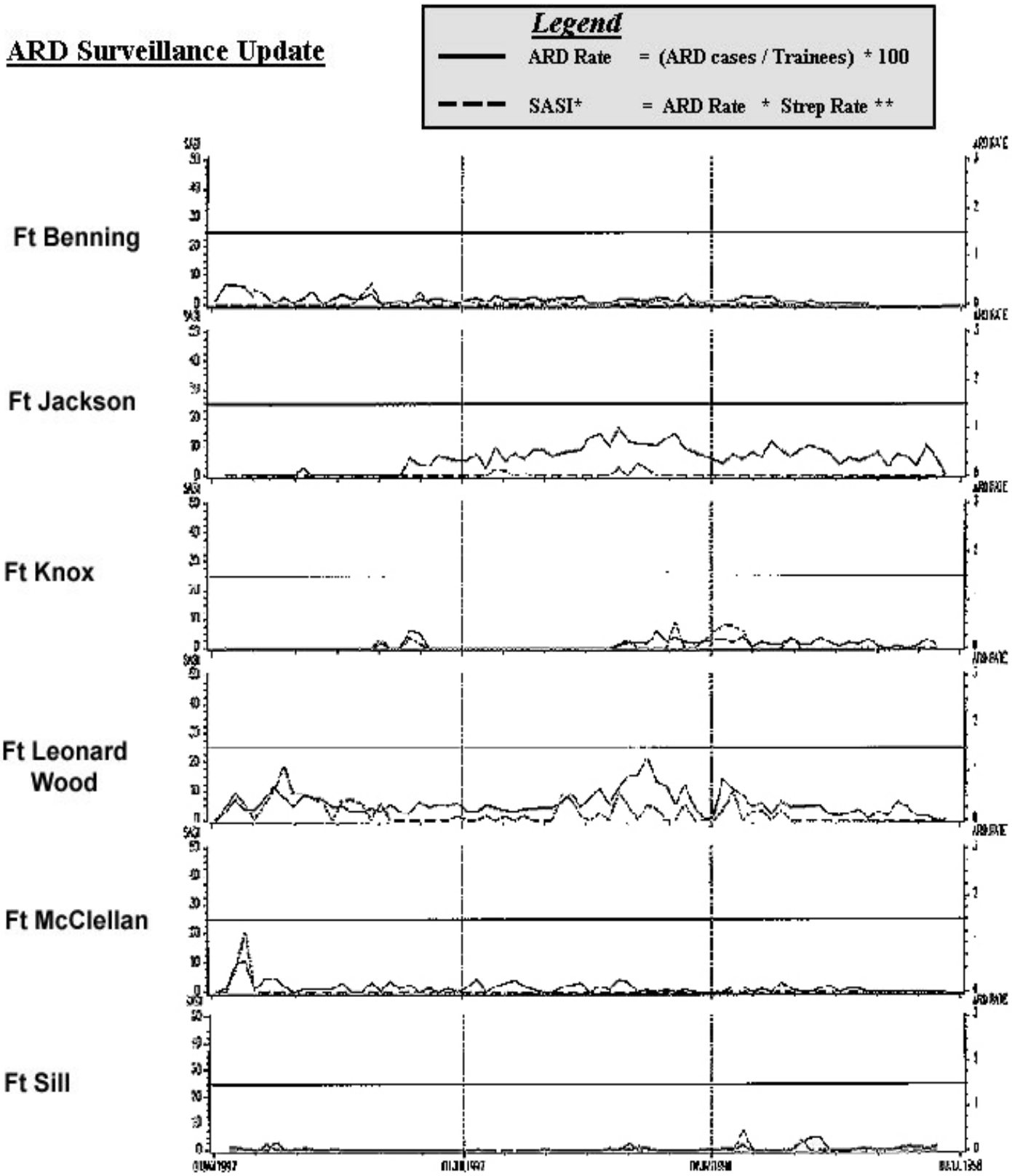

Figure III. ARD surveillance rates, submitted by Army TRADOC posts

* Strep/ARD Surveillance Index (SASI) ** Strep Rate=(GABHS(+) / Cultures) * 100

Note: SASI has proven to be a reliable predictor of serious strep-related morbidity, expecially acute rheumatic fever.

Case Report

Infant Botulism, Walter Reed Army Medical Center

In May 1998, a 5 week old female presented to the pediatric clinic at Walter Reed Army Medical Center (WRAMC) with a two day history of decreased appetite, irritability, and progressively decreasing activity. The child also had a three day history of constipation. Although there was no history of fever or ill contacts, bacterial sepsis was considered a possible cause of the illness. Physical examination revealed a "floppy" infant with little to no facial expression, a weak cry, and inability to suck. A CT scan of the head was normal, and basic metabolic screening was unremarkable.

After one day in the hospital, the child had decreased spontaneous movements and a diminished gag reflex. Her clinical course seemed to be progressing towards total body paralysis. The possibility of infant botulism was introduced by a resident physician who had heard about the case. The diagnosis was supported by electromyographic (EMG) findings and was confirmed by detection of botulinum toxin, type B, in the patient's stool (performed at the Centers for Disease Control and Prevention, Atlanta, Georgia).

On the third hospital day, the infant received human Botulinum Immune Globulin (BIG) under an FDA-approved investigational new drug (IND) emergency use protocol. From the time of the BIG infusion, there was no further progression of paralysis, and over the next two weeks, there was a return of near normal neuromuscular function. The infant was discharged after a 2 1/2 week hospital stay, and she is currently well with no residual effects of her illness.

Editorial comment: Botulism is the clinical manifestation of poisoning with toxins produced by *Clostridium botulinum*, a spore-forming obligate anaerobic bacterium that is distributed in soil worldwide. There are three forms of botulism: infant, foodborne, and wound. All forms are caused by botulinum toxin and have the same pathophysiology. The forms differ only in relation to the sites and circumstances of toxin production.

There are 50-100 cases of botulism reported each year in the U.S. When spores of *C. botulinum* are ingested by infants (e.g., in honey or dust), they can germinate and multiply in the bowel and, in the process, release botulinum toxin, an extremely potent blocker of nerve conduction. As the bacterial toxin is absorbed from the intestine, it is distributed throughout the body in the bloodstream. When toxin reaches presynaptic termini of peripheral nerves, it irreversibly binds to them, preventing their release of acetylcholine and thereby blocking nerve signals to muscles. The cumulative result is a progressive, symmetric, flaccid descending paralysis. As the disease develops, loss of voluntary and involuntary muscle function produces a "floppy" infant that ultimately requires mechanical ventilation for life support. Infants with botulism generally require prolonged hospitalizations and weeks of intensive care. Antibiotics are not helpful and may be harmful (e.g., antibiotics may have synergistic toxic effects, *C. botulinum* may release toxin when killed).[1,2]

With adequate support, the prognosis for recovery from infant botulism is excellent. Although deaths from infant botulism are rare in the U.S., patients and their parents endure long periods of convalescence. In addition, complications of the illness may be life threatening or chronically disabling. Finally, hospitalization costs are extremely high. A review of cases in California from 1992-1997 found that more than $8 million were required for care of approximately 60 infant botulism patients.

Adults and older children with normal gastrointestinal anatomies and microflora are not susceptible to infant botulism, probably because their fully developed gut bacteria do not permit the growth of *C. botulinum*. Adults may get botulism, however, from ingesting preformed toxin, typically

from eating improperly preserved home-processed foods (e.g., canned fruits and vegetables). Five minutes of boiling is required to destroy *C. botulinum* toxin, and even higher temperatures for longer periods are required to inactivate spores. If *C. botulinum* is allowed to contaminate food during its preparation, packaging, or storage, it can produce toxin in sufficient quantity to cause disease upon its ingestion. Even a single suspected case of foodborne botulism constitutes a public health emergency. Immediate actions are required to prevent further consumption of contaminated food and to identify, evaluate, and treat other potential cases. Finally, wound botulism occurs when *C. botulinum* germinates in "dirty" wounds (e.g., traumatic injuries, intravenous drug use).[1]

For decades, adults stricken with foodborne botulism have been successfully treated with equine botulinum antitoxin. Equine antitoxin is not given to children, however, due to risks of severe allergic reactions and serum sickness. Thus, for its first 15 years, standard treatment of infant botulism was entirely supportive. Recently, however, Stephen Arnon, M.D., Director of the California Infant Botulism Treatment and Prevention Program, has directed studies of the use of human Botulism Immune Globulin (BIG) for treating infant botulism.[3] Preliminary findings of his studies have suggested that early treatment of infant botulism with BIG may produce more rapid recoveries than with standard treatment and, in many cases, may eliminate the need for mechanical ventilatory support. Thus, BIG therapy of infant botulism may result in decreased and less severe complications, shortened inpatient courses, and significant cost savings.[3,4] The product is awaiting FDA approval for a nationwide open-label clinical trial. It was made available for use at WRAMC only through an emergency use clinical research protocol.

Report and editorial comment provided by Jeff Bennett, CPT, MC, USAF, Fellow, Pediatric Infectious Diseases, Walter Reed Army Medical Center, Washington, DC.

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